Conclusions: Near 50% of patients with refractory or relapsed HD can be successfully treated with high dose chemotherapy and autologous stem cell transplantation.

It is important to have a longer follow up on these patients so we can perform analysis on prognostic factors for relapse and survival.

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EVALUATING EFFECTIVENESS OF CHANGING THE ADMINISTRATION TIME OF PLERIXAFOR ON PERIPHERAL CD 34 + CELL COUNTS

Johnson, M., Sirilla, J., Elder, P. OSU Medical Center-James Cancer Hospital, Columbus, OH

Plerixafor has been shown to rapidly increase CD 34+ cells in healthy volunteers alone or in combination with Neupogen (Fowler, et al, 2009). The addition of Plerixafor to Neupogen results in a tripling of circulating CD34+ cells 10 hours after administration (Clerq, 2009).

At The Ohio State University Medical Center-James Cancer Hospital, we initially administered Plerixafor at 10 p.m. (10 hours prior to the start of Apheresis). Administering Plerixafor at this time created some issues requiring attention. First, there is the issue of inconvenience to the patient. The patient would come to the hospital at 9:45 p.m., get their dose, go home or to a local hotel, then return to the hospital for Apheresis at 7:30 a.m. the following morning. Secondly, because the outpatient clinic closed at 5:00 p.m., the patient would go to the inpatient unit and have the charge nurse administer the Plerixafor. At times, the inpatient unit had no available rooms to see the patient and observe for side effects, becoming a concern for the inpatient nursing staff to monitor the patient appropriately. Because of these issues, our institution changed the administration time of Plerixafor to 6:15 p.m. The outpatient clinic adjusted their clinic hours to accommodate the need for patients receiving Plerixafor.

Currently, we have administered Plerixafor to 24 patients (2 patients were remobilized with Plerixafor) since the drug received FDA approval in December, 2008. Nineteen patient received Plerixafor at 10 p.m. Of these, sixteen patients had an adequate peripheral CD 34+ count (>10) allowing them to collect an adequate amount of stem cells for transplant. Of the 5 patients that received Plerixafor at 6:15 p.m., 4 patients had an adequate peripheral CD 34+ cell count to proceed to Apheresis.

Changing the time of Plerixafor to 6:15 p.m. aided in the overall safety of the patient. It is less inconvenient for the patient to return to the hospital in the early evening (during daylight hours) and it allows for the outpatient nursing staff to address any issues in an appropriate setting.

Our institution is looking at other areas of improvement using Plerixafor. We are currently using an algorithm in determining which patients may not mobilize an adequate number of CD 34+ cells. Also, we are checking the peripheral CD 34+ cell count on day 4 of Neupogen in patients that are coming to the hospital to have their central line placed to assess the need for Plerixafor that evening.

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NEED OF RECONSIDERATION OF MOBILIZATION STRATEGY IN AUTOLOGOUS STEM CELL TRANSPLANTATION FOR MULTIPLE MYELOMA: RESULTS OF THE POSITIVE IMPACT OF HIGH NUMBER OF CD34 + INFUSED CELLS

Michallet, M.[1], Sobh, M.[1], Nicolini, F.E.[1], Raus, N.[1], Baracco, F.[1], Cannas, G.[1], Chelghoum, Y.[1], Clapisson, G.[1], Thomas, X.[1], Troncy, J.[1], Ducastelle, S.[1] [1]Edouard Herriot Hospital, Lyon, France

This study concerned 130 MM patients who underwent ASCT in our center between years 2000 and 2007. There were 79 males and 51 females with a median age of 56.8 years (34-72). Before transplantation, all patients received granulocyte-colony stimulating factor (G-CSF) 5µg/kg/day, PBSC were mobilized in steady state in 135 cases, 62 after G-CSF + cyclophosphamide. As conditioning, all pts received melphalan alone with a median total dose of 304 mg (130-440). Sixty six patients received a single ASCT and 64 patients received 2 ASCT in a double ASCT program. After transplantation, there were 2 graft failure, 40% of patients received red blood cell (RBC) transfusions (median number: 0 [0-23]), and 64% received platelet transfusions (median number: 1 [0-20]). The median number of days with neutrophils <0.5 G/L was 6 (0-33) and with platelets <20 G/L was 17 (2-104). The median length of hospitalization for auto transplantation was 18 days (14-54). To assess the impact of the infused CD34+ cells number, we have analyzed 2 groups: group 1 (n = 86) for ASCT with a number of CD34 + $\leq 3\times10^6$/kg and group 2 (n = 107) for ASCT with a number of CD34 + $>3\times10^6$/kg.

Results: We found a high significant impact of the high number of infused CD34+(group 2) on platelets recovery (p = 0.002). The univariate analysis using Cox model, showed a trend for the high number of infused CD34+ cells (group2) on leukocyte recovery O.R = 0.748 [0.5-1.0] (p = 0.0568) and a high significant impact of the same group on neutrophils recovery O.R = 0.670 [0.5-0.9] (p = 0.009). These results were not changed even after adjustment on age also on the sequential number of the ASCT in the double auto ASCT program. The multivariate analysis using Cox model, studying the impact of CD34+ group, age, gender, poor prognostic factors [high level of β2microglobulin and del(13)], mobilization (G-CSF alone or G-CSF + cyclophsphamide), showed a significant impact only of poor prognostic factors on overall survival O.R. = 7.94 [1.0-59.2] (p = 0.04) and also on progression free survival (PFS) O.R. = 2.55 [1.1-5.7] (p = 0.024).

Conclusion: High level of infused CD34+ appeared to be very optimal for hematological recovery after ATSC in MM, without any significant impact on O.S and PFS. An economical study is running on this population to assess the impact of this level on hospitalization and treatment costs, results will communicated in the future

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REVIEWING THE STATUS OF BACKUP HEMATOPOIETIC STEM CELLS (HSC) BANKING FOR MULTIPLE MYELOMA (MM) PATIENTS WHO ARE ELIGIBLE FOR AUTOLOGOUS HEMATOPOIETIC STEM CELLS TRANSPLANT (AHSCT) IN THIS POOR ECONOMY

Abidi, M.H.[1,2], Woldie, I.L.[1], Goveas, R.[1], Ratanatharathorn, V.[1,2], Al-Kadhimi, Z.[1,2], Abrams, J.[1,2], Ayash, L.[1,2], Lum, L.[1,2], Uberti, J.[1,2] [1]Wayne State University, Detroit, MI; [2]Karmanos Cancer Center, Detroit, MI

Novel drugs combinations have demonstrated response rates similar to AHSCT. Due to lack of long term follow up, impact of these novel agents on HSC mobilization is unknown. AHSCT is still standard therapy for newly diagnosed MM. There are randomized trials underway to better define the role and timing of AHSCT in MM. Due to this uncertainty with novel agents, arbitrary recommendations are made to cryopreserve backup stem cells for pts who want to postpone AHSCT & to collect additional HSC at 1st HSC collection for future use. There is no consensus on minimum duration of HSC cryopreservation, and this can create significant financial,legal & logistical issues for stem cell laboratories.

Methods: From 03/2000 to 06/2009, 270 MM pts were evaluated for AHSCT at Karmanos Cancer Center, Detroit, MI. This review was conducted to determine utilization of cryopreserved HSC for a 2nd AHSCT at relapse/progression. No stem cells were collected if the intent was not to offer AHSCT. Storage time was calculated as the time between 1st & 2nd BMTs; as time between BMT & death & as time between BMT & last follow-up for those known to be alive.

Results: Two hundred and fifty two eligible pts had HSC stored with the intent to immediately proceed with at least a single AHSCT. Seventeen pts (6.7%) received a 2nd transplant with progressive disease as the most common reason, tandem transplant and refractory disease being other causes to perform delayed AHSCT. Significantly more men than women received a second transplant. Differences in age, race and stage of disease were not statistically significant. The median CD 34^+ cells dose collected was 8×10^6/kg. A median 4.9 $x10^6$ CD 34^+ cells/kg were infused; 26% (66/252) of pts had no cells remaining after 1st transplant. Five (29%) of the 2nd transplants were done during the 6 months following the first transplant. The remainder occurred between 51 and 92 months following first transplant.

At 7 years, the cumulative proportion of those receiving 2nd transplants is 40% (95% CI: 23%, 61%) It should be noted that median follow-up time for those who have not yet received a second transplant is only 14 months and 75% of these pts have been followed for 32 months or less. Thus, in a more mature database with longer follow-up the proportion of those receiving a second transplant may increase.

Conclusion: We need guidelines for cryopreservation of HSC for MM pts based on prospective evaluation to best utilize stem cell laboratory resources.

Table 1. Demographic and Disease Characteristics

	Cryopreserved HSC Used		
	Yes	No	
	Yes = 17	No = 235	Significance
Age (Mean, SEM)	54 (1.8)	57 (0.6)	0.25
Race			0.35
Black	3 (18%)	75 (32%)	
White	14 (82%)	155 (66%)	
Other	0 (–)	5 (2%)	
Gender			0.005
Female	2 (12%)	107 (46%)	
Male	15 (88%)	128 (54%)	
Stage*			0.49
I	0	22 (9%)	
II	8 (47%)	51 (22%)	
III	9 (53%)	161 (69%)	

* Durie Salmon Staging System

GRAFT PROCESSING

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FACTORS AFFECTING CD34 + CELL PURITY, CD34 + CELL RECOVERY, AND LOG T CELL DEPLETION OF PRODUCTS PROCESSED FOR CD34-ENRICHMENT ON THE ISOLEX∠ CELL SEPARATION DEVICE. A SINGLE CENTER EXPERIENCE

Keever-Taylor, C.A.[1], Zhang, L.[2], Konings, S.[1], Skonecki, J.A.[1], Zheng, H.[1], Heidtke, S.A.[1] [1]Medical College of Wisconsin, Milwaukee, WI; [2]Emmes Corporation, Rockville, MD

CD34-enrichment is commonly used as a method for the rigorous removal of T cells from products used for hematopoietic progenitor cell transplantation. Published reports have consistently shown a high level of T cell depletion (TCD) and a high degree of purity in the CD34-enriched products. Recovery of CD34+ cells from the starting fraction has been more variable both within and between centers. We performed univariate (UV) and multi-variable analysis (MV) of 106 enrichment procedures of products obtained from 59 allogeneic donors to determine factors affecting CD34+ cell recovery, log TCD, and product purity. Variables assessed included: the number and concentration of total nucleated cells (TNC) loaded onto the column, starting mononuclear cell (MNC) content, the number of starting CD34+ and CD3+ cells, and time from the end of collection to the start of selection. The analysis used a mixed effect model to adjust for multiple observations from the same donors. Factors found to be associated with better CD34+ cell recovery in the UV included fewer starting TNC, loading concentration ≤4.0E8 TNC/mL, and fewer starting CD34+ cells. Using backward selection, in the MV only starting CD34+ cells and TNC/mL remained independently associated with recovery. Indeed, median CD34+ cell recovery was 63.5% at the lowest quartile of starting CD34+ cell numbers (1.1E8 -3.6E8) and fell progressively to 56.5% (3.7E8-5.4E8), 55.0% (5.5E8-7.3E8), and 42.9% (7.5E8-2.6E9) for the 2nd, 3rd, and 4th quartiles, respectively. The additional effect of TNC/mL was seen regardless of time from collection to start of selection and there was no association of TNC/mL and starting or ending product viability. CD34+ cell purity was greatest at higher starting numbers of TNC and CD34+ cells and at lower MNC content. Here a median CD34+ cell purity of 93.4% was seen for the lowest quartile of starting CD34+ cells versus 98.6% for the highest quartile. Starting CD34+ cells was the only variable affecting Log TCD (poorer TCD with more starting CD34+ cells). In conclusion, CD34+ cell recovery using the Isolex device can be maximized by restricting the number of CD34+ cells loaded onto the column and by ensuring that the TNC loaded are ≤ 4.0E8 TNC/mL. Even though fewer starting CD34+ cells may result in somewhat poorer final product purity, T cell content in the final product was not increased.

Analysis Results

		Dependent Variable					
		CD34 + Cell Recovery		CD34 + Cell purity		Log TCD	
Median (Range):		53.9% (18.3-96.1%)		97.6% (69.9-99.4%)		4.3 (3.5-5.0)	
Independent variable	MEDIAN (RANGE)	UV	MV	UV	MV	UV	MV
Starting TNC	8.0E10 (9.5E9 -1.2E11)	0.0007	-	<0.0001	0.005	NS	-
MNC content	76.3% (26.3 -92.1%)	NS	-	0.042	0.017	NS	-
Starting CD34 + Cells	5.5E8 (1.1E8 -2.6E9)	<0.0001	<0.0001	<0.0001	<0.0001	0.015	0.015
Starting CD3 + Cells	1.7E10 (3.6E9-4.2E10)	NS	-	NS	-	NS	-
Hrs from Collection	23 (4 -55)	NS	-	NS	-	NS	-
TNC/mL	≤4E8 vs >4E8	0.0001	0.018	0.0002	-	NS	-

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A COMPARISON OF IN-SITU CB COLLECTION: VAGINAL VS. CESAREAN SECTION

Miller, S.[1], Kuenne, S.[1], Zarlengo, G.[2], Stark, C.[2], Quinones, R.[1], Freed, B.[1] [1]UC Denver – ClinImmune Labs, Aurora, CO; [2]Exempla St. Joseph Hospital, Denver, CO

With a national cesarean birth rate of >30%, these deliveries represent a significant source of umbilical cord blood. We therefore compared cord blood units (CBU) obtained from planned cesarean (n = 104) and vaginal (n = 581) births at the same hospital over a seven month period in 2009. In both cases, the CBU were collected *in situ*, prior to delivery or removal of the placenta. The cesarean collections were performed with a sterile connecting device placed within the sterile field connected to the CB collection bag outside the field. The mean volume and total nucleated cell count of cesarean CBU (120 ml; 1.4×10^9 TNC) were 33% greater than vaginal CBU (90 ml; 0.9×10^9 TNC; $p < 0.0001$). In addition, cesarean CBU had a 0% contamination rate, compared to 7% for vaginal CBU. CD34+ cell counts were only performed on those CBU that contained $>0.9 \times 10^9$ TNC; the post-processing CD34 counts were not significantly different between cesarean (4.9×10^6) and vaginal births (5.1×10^6). Deferrals for donor ineligibility and maternal risks were only 5% in cesarean collections, compared to 11% of vaginal cord blood donors. There were no safety issues identified for mothers or babies with the cesarean collections. As a result of the higher cord blood volume, lower contamination rates, and fewer deferrals, cesarean collections resulted in a 78% increase in banking efficiency. This study suggests that cesarean births